

09/914329

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/GB00/00610	22 February 2000	25 February 1999
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
MIXTURES OF MATERIALS		
TITLE OF INVENTION		

APPLICANT(S)

POLLITT, Clifford Bruce

Box PCT

Assistant Commissioner for Patents

Washington D.C. 20231

ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. § 1.10*

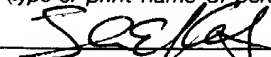
(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this Transmittal Letter and the papers indicated as being transmitted therewith is being deposited with the United States Postal Service on this date 24 August 2001, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL712547889US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Sarah E. Kennedy

(type or print name of person mailing paper)



Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

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NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

- I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:
- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).
 - b. ☐ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

2. Fees

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CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
<input checked="" type="checkbox"/> *	TOTAL CLAIMS	13 - 20 =	0	× \$18.00 =	\$ 0.00
	INDEPENDENT CLAIMS	1 - 3 =	0	× \$80.00 =	0.00
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$270.00				
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an international preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 C.F.R. § 1.492(a)(4)) \$100.00 <input type="checkbox"/> and the above requirements are not met (37 C.F.R. § 1.492(a)(1)) \$690.00 <input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 C.F.R. § 1.492(a)(2)) \$710.00 <input type="checkbox"/> has not been paid (37 C.F.R. § 1.492(a)(3)) \$1000.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 C.F.R. § 1.492(a)(5)) \$860.00				\$860.00
	Total of above Calculations				= \$860.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (note 37 C.F.R. § 1.9, 1.27, 1.28)				-
	Subtotal				\$860.00
	Total National Fee				\$860.00
	Fee for recording the enclosed assignment document \$40.00 (37 C.F.R. § 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$860.00

*See attached Preliminary Amendment Reducing the Number of Claims.

- ☒ Attached is a ☒ check ☐ money order in the amount of \$ 860.00
- ☒ Authorization is hereby made to charge the amount of \$ _____
- ☒ to Deposit Account No. 19-0079
- ☐ to Credit card as shown on the attached credit card information authorization form PTO-2038.

WARNING: Credit card information should **not** be included on this form as it may become public.

- ☒ Charge any additional fees required by this paper or credit any overpayment in the manner authorized above.

A duplicate of this paper is attached.

****WARNING:** "To avoid abandonment of the application the applicant shall furnish to the United States Patent and Trademark Office not later than the expiration of 30 months from the priority date: * * * (2) the basic national fee (see § 1.492(a)). The 30-month time limit may not be extended." 37 C.F.R. § 1.495(b).

WARNING: If the translation of the international application and/or the oath or declaration have not been submitted by the applicant within thirty (30) months from the priority date, such requirements may be met within a time period set by the Office. 37 C.F.R. § 1.495(b)(2). The payment of the surcharge set forth in § 1.492(e) is required as a condition for accepting the oath or declaration later than thirty (30) months after the priority date. The payment of the processing fee set forth in § 1.492(f) is required for acceptance of an English translation later than thirty (30) months after the priority date. Failure to comply with these requirements will result in abandonment of the application. The provisions of § 1.136 apply to the period which is set. Notice of Jan. 3, 1993, 1147 O.G. 29 to 40.

3. ☒ A copy of the International application as filed (35 U.S.C. § 371(c)(2)):

NOTE: Section 1.495 (b) was amended to require that the basic national fee and a copy of the international application must be filed with the Office by 30 months from the priority date to avoid abandonment. "The International Bureau normally provides the copy of the international application to the Office in accordance with PCT Article 20. At the same time, the International Bureau notifies applicant of the communication to the Office. In accordance with PCT Rule 47.1, that notice shall be accepted by all designated offices as conclusive evidence that the communication has duly taken place. Thus, if the applicant desires to enter the national stage, the applicant normally need only check to be sure the notice from the International Bureau has been received and then pay the basic national fee by 30 months from the priority date." Notice of Jan. 7, 1993, 1147 O.G. 29 to 40, at 35-36. See item 14c below.

- a. ☒ is transmitted herewith.
- b. ☐ is not required, as the application was filed with the United States Receiving Office.
- c. ☐ has been transmitted
- i. ☐ by the International Bureau.
Date of mailing of the application (from form PCT/1B/308): _____
- ii. ☐ by applicant on _____. (Date)

4. ☒ A translation of the International application into the English language (35 U.S.C. § 371(c)(2)):

- a. ☐ is transmitted herewith.
- b. ☒ is not required as the application was filed in English.
- c. ☐ was previously transmitted by applicant on _____. (Date)
- d. ☐ will follow.

5. ☒ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

- a. ☐ are transmitted herewith.
- b. ☒ have been transmitted
- i. ☒ by the International Bureau.
Date of mailing of the amendment (from form PCT/1B/308):
31 August 2000
- ii. ☐ by applicant on _____ (Date)
- c. ☐ have not been transmitted as
- i. ☐ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210):

- ii. ☐ the time limit for the submission of amendments has not yet expired.
The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.
6. ☒ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):
- a. ☐ is transmitted herewith.
- b. ☒ is not required as the amendments were made in the English language.
- c. ☐ has not been transmitted for reasons indicated at point 5(c) above.
7. ☒ A copy of the international examination report (PCT/IPEA/409)
- ☒ is transmitted herewith.
- ☐ is not required as the application was filed with the United States Receiving Office.
8. ☒ Annex(es) to the international preliminary examination report
- a. ☒ is/are transmitted herewith.
- b. ☐ is/are not required as the application was filed with the United States Receiving Office.
9. ☒ A translation of the annexes to the international preliminary examination report
- a. ☐ is transmitted herewith.
- b. ☒ is not required as the annexes are in the English language.

10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115

- a. ☐ was previously submitted by applicant on _____
Date
- b. ☐ is submitted herewith, and such oath or declaration
- i. ☐ is attached to the application.
- ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.
- c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):

- a. ☒ is transmitted herewith.
- b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____
- c. ☐ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on _____
Date

12. ☒ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

- a. ☐ is transmitted herewith.
Also transmitted herewith is/are:
- ☐ Form PTO-1449 (PTO/SB/08A and 08B).
- ☐ Copies of citations listed.
- b. ☒ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).
- c. ☐ was previously submitted by applicant on _____
Date

13. ☐ An assignment document is transmitted herewith for recording.
A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

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14. ☒ Additional documents:

- a. ☒ Copy of request (PCT/RO/101)
- b. ☒ International Publication No. WO 00/50355
 - i. ☒ Specification, claims and drawing
 - ii. ☐ Front page only
- c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
- d. ☒ Other
Form PCT/IB/304; Form PCT/IB/332

15. ☒ The above checked items are being transmitted

- a. ☒ before 30 months from any claimed priority date.
- b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:

AUTHORIZATION TO CHARGE ADDITIONAL FEES

WARNING: Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ Please charge, in the manner authorized above, the following additional fees that may be required by this paper and during the entire pendency of this application:

☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

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☒ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☒ 37 C.F.R. § 1.17 (application processing fees)

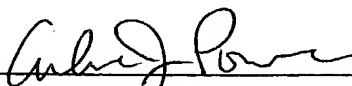
☒ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).


SIGNATURE OF PRACTITIONER

Reg. No.: 35,985

Arlene J. Powers

Tel. No.: (617) 426-9180

(type or print name of practitioner)

225 Franklin Street, Suite 3300

Customer No.:

P.O. Address

Boston, MA 02110

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1 3. (Amended) A settable mixture according Claim 1 [or Claim 2], wherein the particulate
2 material comprises dry sand being at least 90% silica sand.

1 4. (Amended) A settable mixture according to Claim 1 [or Claim 2], wherein the
2 particulate material includes a mixture of materials containing no more that 1.4% by weight of
3 Aluminium Oxide, and no more than 0.5% by weight of Ferrous Oxide.

1 5. (Amended) A settable mixture according to [any preceding claim] Claim 1, wherein the
2 polybutadiene is provided in liquid form.

1 6. (Amended) A settable mixture according to [any preceding claim] Claim 1, including a
2 re-odoriser.

1 10. (Amended) A settable mixture according to claim 1 [or Claim 9], wherein the
2 particulate material is sand consisting [predominantly] of grains having an angular or sub-angular
3 shape.

1 11. (Amended) A settable mixture according to [any preceding claim] Claim 1, bagged so
2 as to be contained in an [essentially] oxygen-free atmosphere.

1 12. (Amended) A settable mixture according to [any preceding claim] Claim 1, including
2 a colourant.

1 13. (Amended) A settable mixture according to Claim 1, wherein the material is contained
2 in an [essentially] oxygen-free atmosphere containing an inert gas.

The first system of musical notation for 'The Rose Tree' is written on a single staff. It begins with a treble clef and a key signature of one flat (B-flat). The melody consists of a series of eighth and sixteenth notes, with some rests. The lyrics 'The Rose Tree' are written below the staff, aligned with the notes.

Examination on the merits is respectfully requested.

Anthony Rove

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MIXTURES OF MATERIALS

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THIS INVENTION relates to mixtures of materials.

According to the invention, a settable mixture comprises polybutadiene, a flow-enhancing liquid, and [substantially] dry particulate material, the latter having no more than 2% water content and containing no more than 2% Aluminium Oxide, and no more than 1% Ferrous Oxide, the percentages being by weight of particulate material.

The flow-enhancing liquid may be a flow-enhancing solvent.

The particulate material may comprise dry sand being at least 90% silica sand; ground or crushed glass, for example, including recycled glass and ground or crushed glass products which may include some non-glass material; ground slate or other mineral, for example granite or stone. However, preferably the particulate material as a whole should not contain more than 1.4% by weight of Aluminium Oxide, nor more than 0.5% by weight of Ferrous Oxide.

The particulate material may be a mixture of different materials.

The polybutadiene may be in liquid form.

The settable mixture may contain a re-odoriser.

THIS INVENTION relates to mixtures of materials.

According to the invention, a settable mixture comprises polybutadiene, a flow-enhancing liquid, and dry particulate material, the latter having no more than 2% water content and containing no more than 2% Aluminium Oxide, and no more than 1% Ferrous Oxide, the percentages being by weight of particulate material.

The flow-enhancing liquid may be a flow-enhancing solvent.

The particulate material may comprise dry sand being at least 90% silica sand; ground or crushed glass, for example, including recycled glass and ground or crushed glass products which may include some non-glass material; ground slate or other mineral, for example granite or stone. However, preferably the particulate material as a whole should not contain more than 1.4% by weight of Aluminium Oxide, nor more than 0.5% by weight of Ferrous Oxide.

The particulate material may be a mixture of different materials.

The polybutadiene may be in liquid form.

The settable mixture may contain a re-odouriser.

1 1. A settable mixture comprising polybutadiene, a flow-enhancing liquid, and dry
2 particulate material, the latter having no more than 2% water content and containing no more
3 than 2% Aluminium Oxide, and no more than 1% of Ferrous Oxide, the percentages being by
4 weight of particulate material.

1 2. A settable mixture according to Claim 1, wherein the flow-enhancing liquid is a
2 flow-enhancing solvent.

1 3. A settable mixture according Claim 1, wherein the particulate material comprises
2 dry sand being at least 90% silica sand.

1 4. A settable mixture according to Claim 1, wherein the particulate material includes a
2 mixture of materials containing no more than 1.4% by weight of Aluminium Oxide, and no
3 more than 0.5% by weight of Ferrous Oxide.

1 5. A settable mixture according to Claim 1, wherein the polybutadiene is provided in
2 liquid form.

1 6. A settable mixture according to Claim 1, including a re-odoriser.

1 7. A settable mixture according to Claim 6, wherein the proportion of the re-odoriser
2 within the mixture is between 0.001% and 5% by weight of settable mixture.

1 8. A settable mixture according to Claim 2, wherein the flow enhancing solvent is a
2 de-aromatised hydrocarbon.

1 9. A settable mixture according Claim 1, wherein the particulate material is sand of
2 special fraction size in the range of grain size 0.01mm to 0.85mm and is dried to have a
3 maximum 2% water content by weight absorbed from the atmosphere after drying.

1 10. A settable mixture according to claim 1, wherein the particulate material is sand
2 consisting of grains having an angular or sub-angular shape.

1 11. A settable mixture according to Claim 1, bagged so as to be contained in an
2 oxygen-free atmosphere.

1 12. A settable mixture according to Claim 1, including a colourant.

1 13. A settable mixture according to Claim 1, wherein the material is contained in an
2 oxygen-free atmosphere containing an inert gas.

MIXTURES OF MATERIALS

THIS INVENTION relates to mixtures of materials.

According to the invention, a settable mixture comprises polybutadiene, a flow-enhancing liquid, and substantially dry particulate material, the latter containing no more than 2% Aluminium Oxide, and no more than 1% Ferrous Oxide, the percentages being by weight of particulate material.

The flow-enhancing liquid may be a flow-enhancing solvent.

The particulate material may comprise dry sand being at least 90% silica sand; ground or crushed glass, for example, including recycled glass and ground or crushed glass products which may include some non-glass material; ground slate or other mineral, for example, granite or stone. However, preferably the particulate material as a whole should not contain more than 1.4% by weight of Aluminium Oxide, nor more than 0.5% by weight of Ferrous Oxide.

The particulate material may be a mixture of different materials.

The polybutadiene may be in liquid form.

The settable mixture may contain a re-odouriser.

The proportion of the re-odoriser may be between 0.001% and 5% by weight of the settable mixture.

An example of a flow-enhancing liquid is Shellsol D25SBP 140/165.

The settable mixture is not adhesive, i.e. it is not tacky to the touch and can, for example, be placed on laid tiles and paving and swept into the gaps using a brush or the like, or placed directly into the gaps between the tiles or paving to act as a filler without sticking to the surface of the tiles or paving.

The particles in the particulate material may be of uniform size or different sizes.

There may be additions, for example, colourants and/or reinforcing materials e.g. synthetic or carbon fibres.

Suitable re-odorisers are those sold under the name FRAG 6M 3467 by Gale and Mount Limited, Manchester, England and MASQUADOR TF, by Protex Limited, Leeds, England.

The sand is preferably of special fraction size predominantly in the range of grain size 0.01mm to 0.85mm and is dried to have a maximum 2% water content by weight absorbed from the atmosphere after drying.

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The mixture may be bagged so as to be contained in an essentially oxygen-free atmosphere.

The invention includes paving, flooring and wall elements secured or spaced apart by said mixture when set.

The invention may be performed in various ways and some specific embodiments with possible modifications will now be described by way of example.

The invention provides a mixture which is settable on exposure to atmosphere (oxygen) and can be used indoors or outdoors for use as a screed or for pointing paving or flooring e.g. stones, cobbles, setts, tiles, concrete or clay or stone slabs; or for pointing wall tiles or bricks.

In general the mixture comprises polybutadiene, a flow-enhancing liquid and particulate material. The polybutadiene is provided in liquid form prior to mixing.

The particulate material which should be substantially dry, may, for example, comprise dry sand; ground or crushed glass, for example, including recycled glass and ground or crushed television tubes or fluorescent tubes which may include some non-glass material; ground slate or other mineral for example granite, stone; or a mixture of materials.

The flow-enhancing liquid, in addition to improving

workability of the mixture, also improves cross-linking strengths within the mixture and provides for adequate flexural and compressive strengths in the compound after setting, making it particularly suitable for jointing and screeding in areas where the paving or the like comes under extreme stresses. It shall occupy between 0.1% and 0.4%, by volume, of the settable mixture.

The flow-enhancing liquid shall preferably have an evaporation index to DIN 53170 of less than 50. It shall also preferably be a de-aromatised hydrocarbon. An example is Shellsol D25 SBP 140/165, having an evaporation index of 20.

If glass particles are included in the particulate material, these may be of uniform size or different sizes.

The term dry sand includes sand which has been dried and has then absorbed some moisture from the atmosphere, but preferably no greater than 2% by weight.

A particularly suitable form of liquid polybutadiene is that sold under the name Univest-S by Promacon Dr. Schirm GmbH, of Dortmund, Germany, and ideally occupies the settable mixture in an amount of between 1.5% and 6% by volume, and preferably between 2% and 4% by volume.

A particularly preferred sand is kiln dried silica sand of special fraction size and having a maximum of 1.4% of Aluminium

Oxide, a maximum of 0.5% Ferrous Oxide and a maximum of 1.5% combined Potassium Oxide and Sodium Oxide, these percentages being by weight of the sand.

The fraction size should be a good mix predominantly within the range 0.01mm to 0.85mm. At least 40% of the sand should preferably average 0.26mm in size. Rounded or sub-rounded grains can be used but a predominance of grains having an angular or sub-angular shape is preferred.

Examples of suitable settable mixtures are:-

- | | | | |
|----|-----------|-----------|---|
| 1. | 2% - 4% | By volume | Polybutadiene |
| | 0.1-0.4% | By volume | Shellsol D25 |
| | 0.007% | By volume | Re-Odoriser |
| | Balance % | By volume | Kiln dried silica sand special fraction size (as specified above) |
| 2. | 2% - 4% | By volume | Polybutadiene |
| | 0.1-0.4% | By volume | Shellsol D25 |
| | 1% - 5% | By volume | Synthetic or carbon fibres |
| | 0.007% | By volume | Re-Odoriser |
| | Balance % | By volume | Kiln dried silica sand special fraction size (as specified above) |
| 3. | 2% - 4% | By volume | Polybutadiene |
| | 0.1-0.4% | By volume | Shellsol D25 |
| | 0.1%-0.5% | By volume | Dry colour pigment |
| | 0.007% | By volume | Re-Odoriser |
| | Balance % | By volume | Kiln dried silica sand special fraction size (as specified above) |
| 4. | 2% - 4% | By volume | Polybutadiene |
| | 0.1-0.4% | By volume | Shellsol D25 |
| | 1% - 5% | By volume | Synthetic or carbon fibres |
| | 0.1%-0.5% | By volume | Dry colour pigment |
| | 0.007% | By volume | Re-Odoriser |
| | Balance % | By volume | Kiln dried silica sand special fraction size (as specified above) |

The above examples contain sand as the particulate filler but other materials as referred to above may be used with the sand.

By ensuring that the sand content of the mixture is predominantly silica sand i.e. having a Silicon Oxide content of at least 90%, a number of advantages occur, namely:-

- a) staining of adjacent paving surfaces is minimised or eliminated;
- b) a chemical reaction within the bagged mixture which can retard its setting time, is prevented (this reaction may be experienced with sands falling outside the limits specified);
- c) any such chemical reaction which could also significantly reduce the shelf life of the bagged mixture, is avoided;
- d) keeping the mixture dry for a considerable time after application is not necessary since the setting time is kept as short as possible;
- e) a reduced setting time enables the mixture to be used to fill deeper joints between paving without the risk of ingress of moisture from the ground beneath.

The re-odoriser is required particularly for use in internal and confined places but is also suitable for external applications when the polybutadiene alone can have a quite unpleasant odour.

The mixture may contain a colourant for ease of identity or for aesthetic purposes.

The mixing is done quickly and preferably by machine, to avoid or limit any setting which might occur due to heat and exposure to atmospheric oxygen.

After mixing, the mixture is placed in bags or other convenient containers, and vacuum packed to remove oxygen (air) and thus suspend the setting process in a substantially oxygen-free atmosphere until the bag is opened. The mixture may be contained in convenient amounts. The bags are preferably housed within impact-resistant boxes, to prevent perforation and for ease of transportation and storage.

If required, to maintain flexibility in the bag, the extracted air may be replaced by a small volume of an inert gas such as carbon dioxide or nitrogen.

CLAIMS

1. A settable mixture comprising polybutadiene, a flow-enhancing liquid, and substantially dry particulate material, the latter containing no more than 2% Aluminium Oxide, and no more than 1% of Ferrous Oxide, the percentages being by weight of particulate material.
2. A settable mixture according to Claim 1, wherein the flow-enhancing liquid is a flow-enhancing solvent.
3. A settable mixture according to Claim 1 or Claim 2, wherein the particulate material comprises dry sand being at least 90% silica sand.
4. A settable mixture according to Claim 1 or Claim 2, wherein the particulate material includes a mixture of materials containing no more than 1.4% by weight of Aluminium Oxide, and no more than 0.5% by weight of Ferrous Oxide.
5. A settable mixture according to any preceding claim, wherein the polybutadiene is provided in liquid form.
6. A settable mixture according to any preceding claim, including a re-odouriser.
7. A settable mixture according to Claim 6, wherein the

proportion of the re-odouriser within the mixture is between 0.001% and 5% by weight of the settable mixture.

8. A settable mixture according to Claim 2, wherein the flow enhancing solvent is a de-aromatised hydrocarbon.

9. A settable mixture according to Claim 1, wherein the particulate material is sand of special fraction size in the range of grain size 0.01mm to 0.85mm and is dried to have a maximum 2% water content by weight absorbed from the atmosphere after drying.

10. A settable mixture according to claim 1 or Claim 9, wherein the particulate material is sand consisting predominantly of grains having an angular or sub-angular shape.

11. A settable mixture according to any preceding claim, bagged so as to be contained in an essentially oxygen-free atmosphere.

12. A settable mixture according to any preceding claim, including a colourant.

13. A settable mixture according to Claim 1, wherein the material is contained in an essentially oxygen-free atmosphere containing an inert gas.

ABSTRACT

MIXTURES OF MATERIALS

A settable but non-adhesive mixture of materials which may be used in the laying of tiles and paving whereby the mixture may fill the gaps between individual tiles or paving elements to act as a filler to stabilise the elements without sticking to the surfaces thereof, the mixture including a particulate material which contains no more than 2% Aluminium Oxide and no more than 1% Ferrous Oxide thus to ensure a stabilised chemical composition of the mixture and to minimise staining of the tiles or paving elements when applied thereto.

DECLARATION, PETITION AND POWER OF ATTORNEY FOR
PATENT APPLICATION

Attorney Docket No:

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

the specification of which (check only one):

☐ is attached hereto.☐ was filed as United States Patent Application☐ Serial No. _____

on _____

and was amended

on _____

☒ (if applicable)

was filed as PCT Patent Application

Serial No. PCT/GB 00/00610on 22 February, 2000

and was amended under PCT Article 19

on 27th March, 2001

(if applicable)

I hereby state that I have reviewed and understand the contents of the specification, including the claims as amended by any amendment referred to herein.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119:

COUNTRY (if PCT indicate PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. § 119 (YES/NO)
PCT	PCT/US 00/00610	22 February 2000	YES
GB	9904279.8	25 February 1999	YES

APPLICATION

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below.

PRIOR U.S. APPLICATIONS FOR BENEFIT UNDER 35 U.S.C. § 119(e):

APPLICATION NUMBER

FILING DATE

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior applications and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATION(S) DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. § 120:

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(day, month, year)STATUS: (PATENTED, PENDING
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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

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Wherefore I petition that letters patent be granted to me for the invention or discovery described and claimed in the attached specification and claims, and hereby subscribe my name to said specification and claims and to the foregoing declaration, power of attorney, and this petition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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